

WE CLAIM:

1. A method of generating and assembling secretory antibodies within a single cell, said method comprising:

- 5 a. introducing into the genome of a first member of a plant species a first mammalian nucleotide sequence encoding an immunoglobulin alpha heavy chain portion-containing polypeptide including a leader sequence forming a secretion signal, to produce a first transformant;
- 10 b. introducing into the genome of a second member of said plant species a second mammalian nucleotide sequence encoding a polypeptide linker or joining chain, to produce a second transformant;
- c. introducing into the genome of a third member of said plant species a third mammalian nucleotide sequence encoding a secretory component, to produce a third transformant;
- 15 d. sexually crossing said transformants to generate a progeny population containing all three mammalian sequences; and
- e. isolating from said progeny population a transgenic plant species producing a secretory antibody.

20 2. The method of claim 1, wherein said method further comprises introducing into the genome of a fourth member of said plant species a fourth mammalian nucleotide sequence encoding an immunoglobulin light chain portion-containing polypeptide including a leader sequence forming a secretion signal, to produce a fourth transformant; sexually crossing said fourth transformant with said other transformants to generate a progeny population containing all four mammalian sequences; and isolating from said progeny population a transgenic plant species producing a

25 secretory antibody.

3. The method of claim 1, wherein said first mammalian nucleotide sequence encodes a single-chain antibody.

30 4. The method of claim 1, wherein said first mammalian nucleotide sequence encodes an immunoglobulin alpha heavy chain portion-containing polypeptide including more than one variable region.

5. The method of claim 1, wherein nucleotide sequences are introduced via separate vectors.

6. A transgenic plant comprising:

- a. plant cells that contain a nucleotide sequence encoding one or more immunoglobulin heavy-chain polypeptides, a nucleotide sequence encoding a polypeptide linker or joining chain, and a nucleotide sequence encoding a secretory component; and
- b. immunologically active secretory antibodies encoded by said nucleotide sequences.
- 5 7. The plant of claim 6, further comprising a nucleotide sequence encoding one or more light-chain polypeptides.
- 8. The plant of claim 6, wherein all three nucleotide sequences are contained within a single cell.
- 9. The plant of claim 7, wherein all four nucleotide sequences are contained within a single cell.
- 10 10. The plant of claim 6, which is a dicotyledonous plant.
- 11. The plant of claim 6, which is a monocotyledonous plant.
- 12. The plant of claim 6, wherein each of said nucleotide sequences is included on a separate vector.
- 15 13. A method of passively immunizing a human or animal subject against a preselected ligand, comprising administering to said subject a prophylactic amount of a biologically active immunoglobulin molecule capable of binding a preselected ligand, wherein said molecule is free from detectable sialic acid residues.
- 14. The method of claim 13, wherein said immunoglobulin molecule is encapsulated in a plant cell.
- 20 15. The method of claim 13, wherein said immunoglobulin molecule is administered as part of a composition, which composition further comprises a material having nutritional value.
- 16. The method of claim 15, wherein said material having nutritional value is derived from a plant or an animal.
- 25 17. The method of claim 13, wherein said immunoglobulin molecule is administered as part of a composition, which composition further comprises a physiologically inert material.
- 18. The method of claim 13, wherein said immunoglobulin is an antibody or an immunologically active derivative or fragment thereof.
- 19. The method of claim 13, wherein said immunoglobulin is secretory IgA or an immunologically active derivative or fragment thereof.
- 30 20. The method of claim 13, wherein said preselected ligand is a pathogen antigen.